(12)

## **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3: 11.05.2005 Bulletin 2005/19

(51) Int Cl.7: **H01L 21/48**, H01L 23/538

(43) Date of publication A2: **22.03.2000 Bulletin 2000/12** 

(21) Application number: 99118391.4

(22) Date of filing: 16.09.1999

(84) Designated Contracting States:

AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE

**Designated Extension States:** 

AL LT LV MK RO SI

(30) Priority: 18.09.1998 JP 26441098

(71) Applicants:

 NEC Compound Semiconductor Devices, Ltd. Kawasaki, Kanagawa 211-8666 (JP)

Fuchigami Micro Co.,Ltd.
 Kagoshima-shi, Kagoshima (JP)

(72) Inventors:

Hirasawa, Koki.
 Minato-ku, Tokyo (JP)

 Ono, Teruo Kiire-cho, Ibusuki-gun, Kagoshima (JP)

(74) Representative: Glawe, Delfs, Moll & Partner Patentanwälte
Postfach 26 01 62
80058 München (DE)

## (54) Multilayered circuit board for semiconductor chip module, and method of manufacturing the same

(57) A multilayered circuit board for a semiconductor chip module includes an underlying board, insulating layers, fixed-potential wiring layers, via holes, and metal layers. The underlying board has a major surface made of a metal material to which a fixed potential is applied. The insulating layers are stacked on the major surface of the underlying board and have wiring layers formed on their surfaces. The fixed-potential wiring layers constitute part of the wiring layers formed on the insulating layers. The via holes are formed below the fixed-potential wiring layers to extend through the insulating layers.

The metal layers are filled in the via holes so as to make upper ends be connected to the lower surfaces of the fixed-potential wiring layers. One of the insulating layers in contact with the major surface of the underlying board is formed on the underlying board while the lower end of the metal layer is in contact with the major surface of the underlying board. The other insulating layer formed on the insulating layer in contact with the major surface of the underlying board is stacked while the lower end of the metal layer is in contact with the upper surface of the fixed-potential wiring layer of one insulating layer.

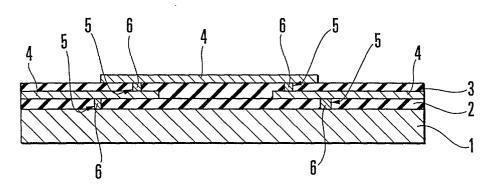


FIG. 1



## **EUROPEAN SEARCH REPORT**

Application Number EP 99 11 8391

Category		dication, where appropriate,	Relevant	CLASSIFICATION OF THE
Х	of relevant passa EP 0 494 668 A (NEC 15 July 1992 (1992- * abstract *	CORPORATION)	to claim	H01L21/48 H01L23/538
γ	* column 5, line 18 * figures 1-5 *	5 - column 11, line 32 *	6,7,12	
Υ	US 5 440 805 A (DAI	GLE ET AL)	6,7,12	
A	15 August 1995 (199 * abstract *	5-08-15)	1,2,4,5, 9-11	
	* column 4, line 42 * column 5, line 56 * column 6, line 8 * column 8, line 42 * column 9, line 8 * figures 10-12 *	- line 63 * - line 26 * - line 51 *	9-11	
A	ELECTRIC CO) 17 Nov * abstract * * column 3, line 1 * column 4, line 36 * column 5, line 16 * column 6, line 13 * column 11, line 1 * tolumn 11, line 4 * * figures 2,3,7,8 *	- line 42 * - line 17 * 5 - line 21 * 3 - column 12, line 47	1-5,8-12	TECHNICAL FIELDS SEARCHED (Int.CI.7) H05K H01L
	The present search report has been place of search	Date of completion of the search		Examiner
	Berlin	17 March 2005	Mor	ena, E
X : parti Y : parti docu A : tech O : non	ATEGORY OF CITED DOCUMENTS ioularly relevant if taken alone cularly relevant if combined with another to the same category nological background written disclosure rediate document	L : document cited fo	sument, but publis e n the application or other reasons	hed on, or

EPO FORM 1503 03.82 (P04C01)

## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 99 11 8391

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on

The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

17-03-2005

cited in search report		date		member(s)	date
EP 0494668	Α	15-07-1992	JP	2616588 B2	04-06-
			JP	4312998 A	04-11-
			JP	4312999 A	04-11-
			JP	2751678 B2	18-05-
			JP	5037159 A	12-02-
			JP	2776096 B2	16-07-
			JP	5206643 A	13-08-
			JР	3016292 B2	06-03-
			JΡ	5144973 A	11-06-
			JΡ	2921223 B2	19-07-
			JP	5144974 A	11-06-
			CA	2059020 A1	10-07-
			DE	69223657 D1	05-02-
			DE	69223657 T2	30-04-
			EP	0494668 A2	15-07-
			ŪS	5426849 A	27-06-
			US	5321210 A	14-06-
			CA	2074648 A1	27-01
			DE	69218319 D1	24-04
			DE	69218319 T2	10-07
			EP	0526133 A2	03-02
			US	5628852 A	13-05
			US	5686702 A	11-11
			CA	2083077 A1	19-05
			DE	69213890 D1	24-10
			DE	69213890 T2	30-01
			EP	0543331 A2	26-05
			CA	2083072 A1	22-05
			DE	69220892 D1	21-08
			DE	69220892 T2	20-11
			EP	0543364 A2	26-05
			US	5322593 A	21-06
 US 5440805	Α	15-08-1995	US	5287619 A	22-02
		10 00 1000	EP	0645952 A1	29-03
			JP	7170069 A	04-07
			EP	0560077 A2	15-09
		17 11 1004		6210070 4	O4 11
EP 0624904	Α	17-11-1994	JP	6310870 A	04-11
			JP	8028580 B	21-03
			CA	2121712 A1	22-10
			DE	69431740 D1	02-01
			DE	69431740 T2	24-04
			EP	0624904 A2	17-11
			US	5534666 A	09-07
			US	5590461 A	07-01